The Defense S&T Budget and Investment Focus

Mr. Robert W. Baker

April, 2004

Deputy Director, Plans & Programs, ODDR&E

DDR&E Priorities for CY 2004

Technical

- **Support Transformation**
  - **National Aerospace Initiative, Energy and Power Technologies, Surveillance and Knowledge Systems**
  - **6 QDR Operational Goals**
- **Support War on Terrorism**
- **Expand Outreach to Combatant Commands & Intelligence Community**

Non-Technical

- **Technology Transition**
- **National Security S&E Workforce**

FY05 RDT&E Budget Request

FY05 RDT&E = $68.9B requested (Budget Activity 1-7)

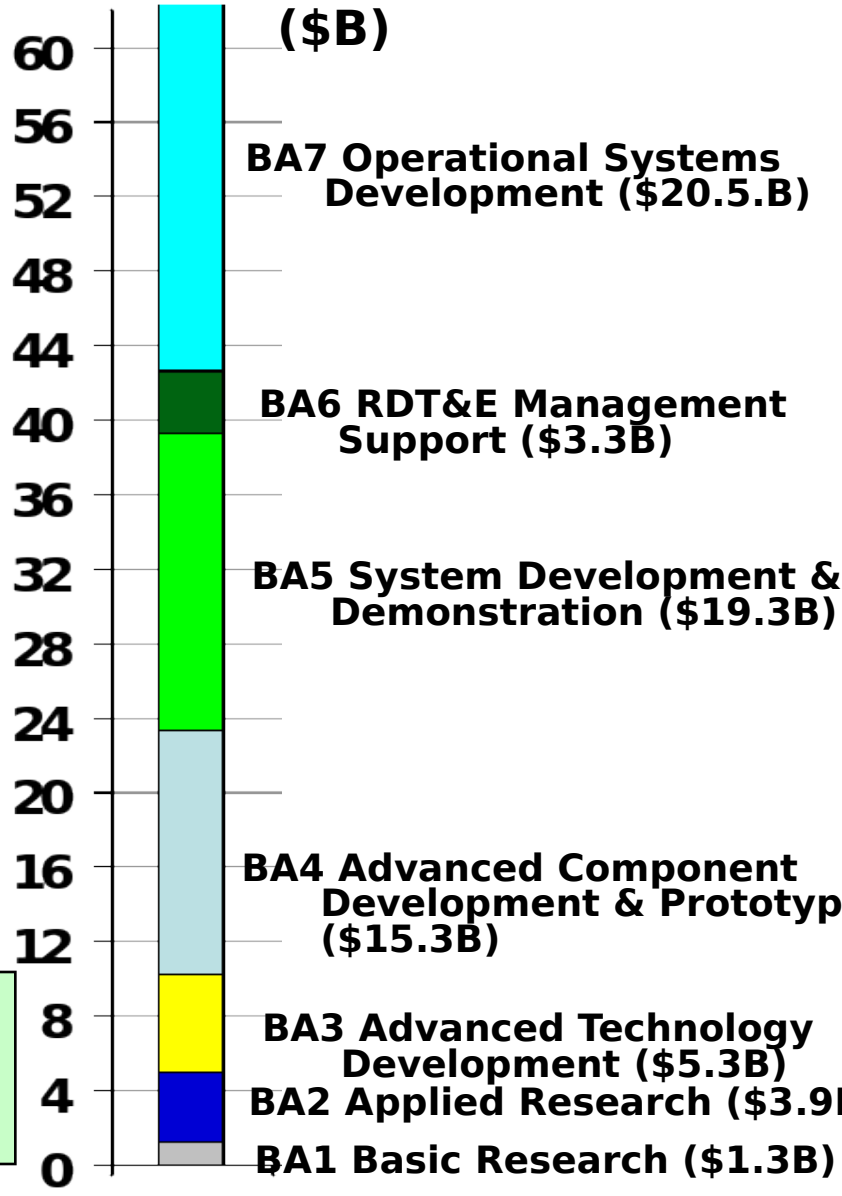
(BA6 + BA7 = $23.8B)

Development (BA4 + BA5 = $34.6B)

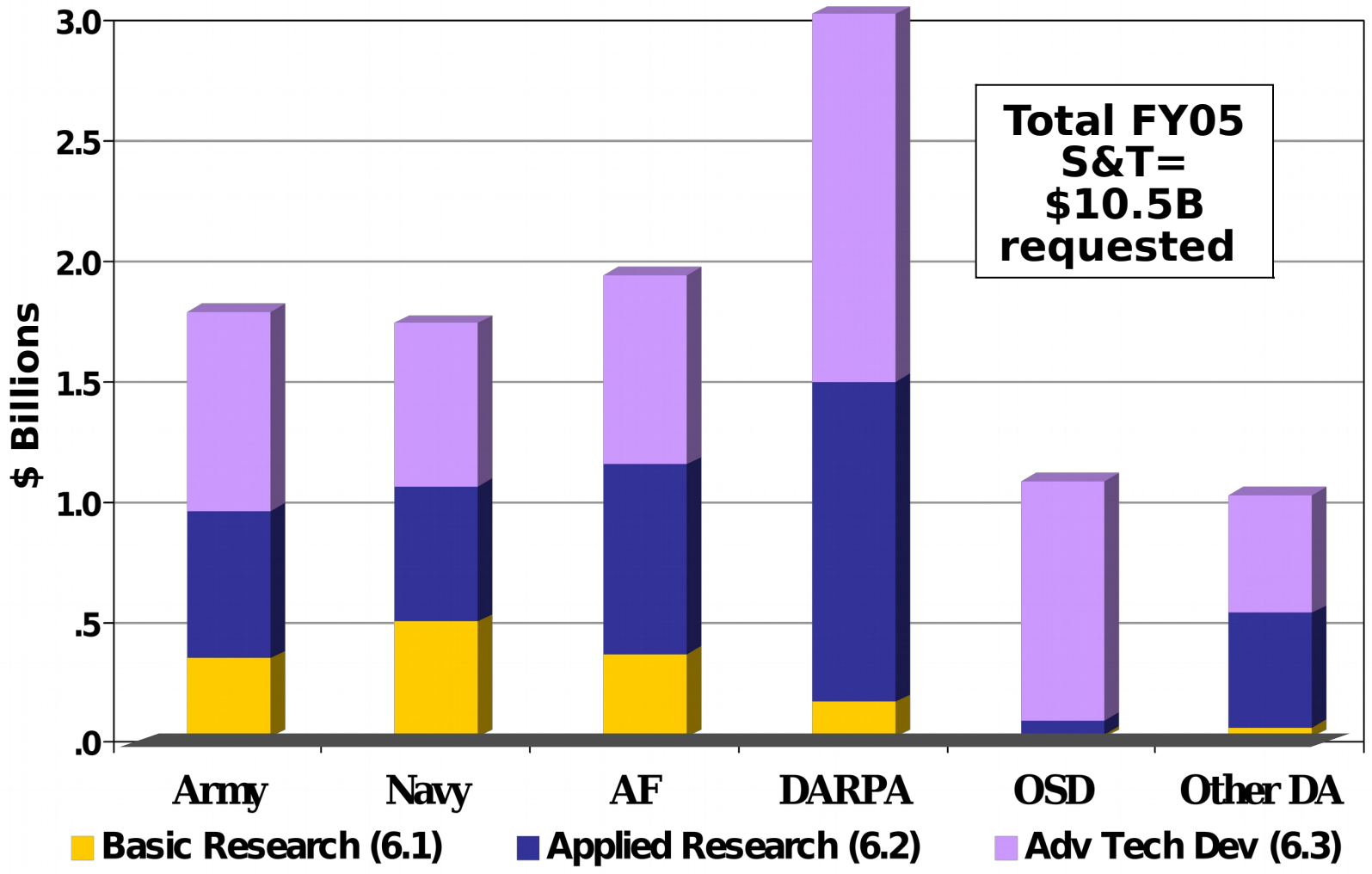
Science and Technology (6.1 + 6.2 + BA3 = $10.5B)

Technology Base (BA1 + 2) = $5.2B)

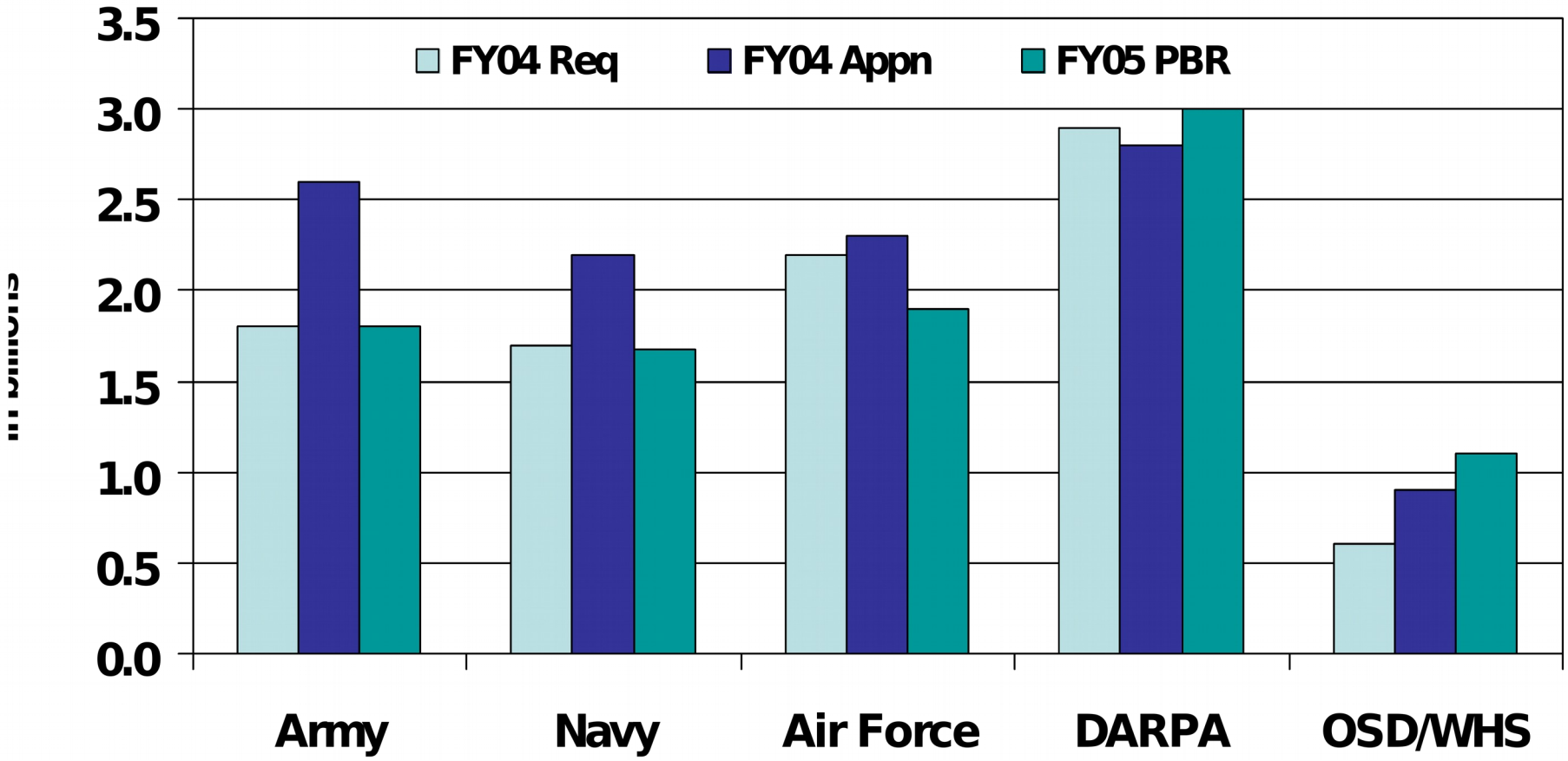
15% of RDT&E



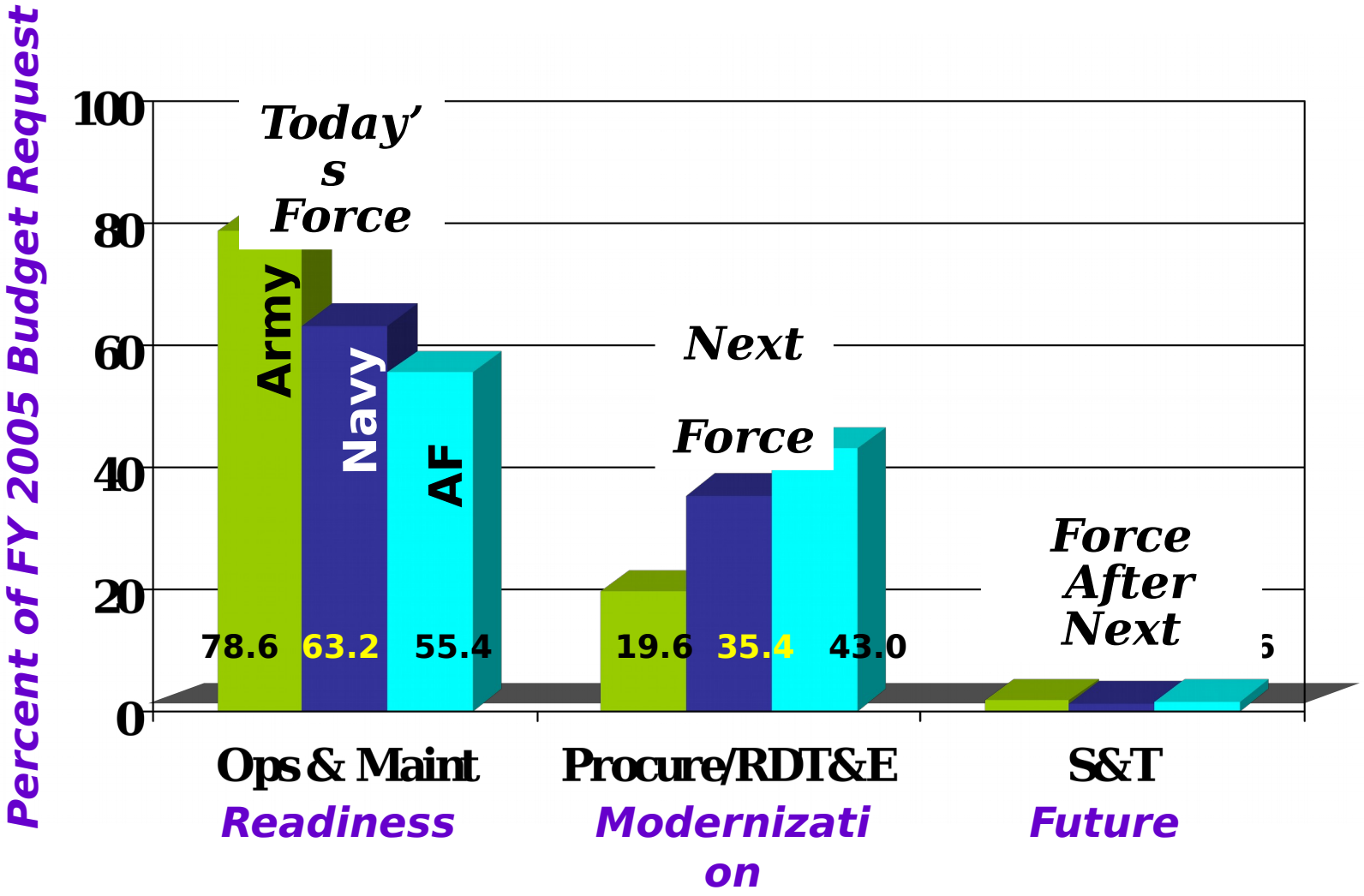
FY05 Budget Request DoD S&T



Science & Technology Trends



Technology Investment
Percent of Overall Budget Request



Devolvement

- **Total FY04 $ devolved to the Services: $333.6M**
  - **Devolvement was 3.3% of total DoD S&T FY04 PBR**
  - **FY05 Service funding support for devolved programs remained solid**
- **To Army**
  - **Force Health Protection: $9.8M**
  - **DEPSCOR: $9.7M**
  - **Historically Black Colleges and Universities: $14.1M**
  - **University Research Initiative: $71.6M**
  - **Explosive Demilitarization Technology: $9.4M**
  - **Total Devolved to Army: $90.8M**

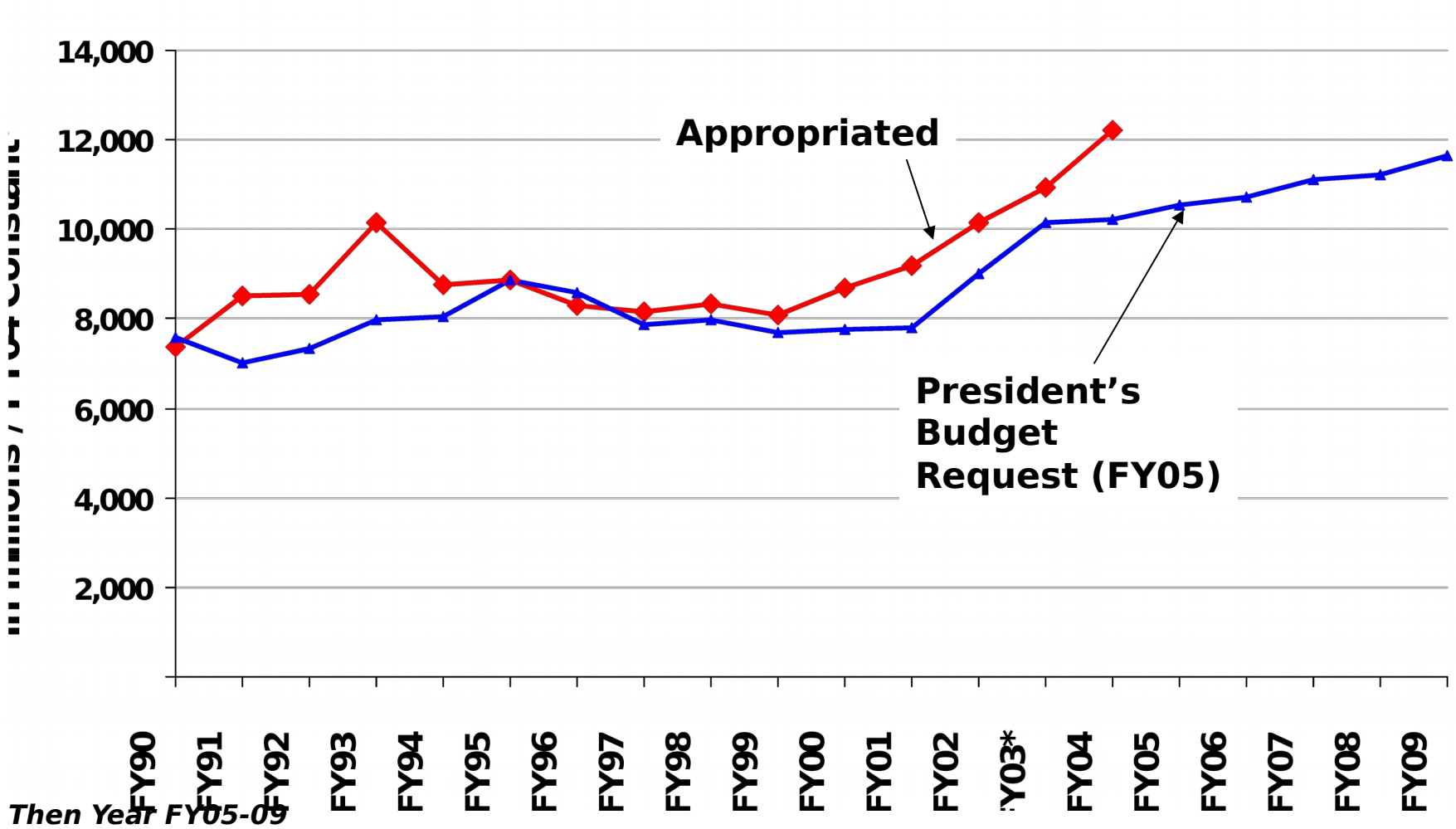
Devolvement (Con't)

- **To Navy**
  - **University Research Initiative: $70.6M**
  - **In House Laboratory Independent Research: $2.2M**
  - **Total Devolved to Navy: $72.8M**
- **To Air Force**
  - **High Energy Laser**
    - **Research Initiatives: $12.1M**
    - **Applied Research: $41.8M**
    - **Advanced Technology Demonstration: $10.9M**
  - **High Performance Computer Modernization: $185.3M**
  - **University Research Initiative: $105.2M**
  - **Total Devolved to the Air Force: $170.0M**

FY05 S&T Budget Facts

- **Total FY05 PBR is $10.553B — $322M greater than FY04 request**
  - **Less than FY04 Appropriated Budget of $12.21B**
- **Notes on FY 05 Budget:**
  - **DoD goal was a 2-year budget with program stability**
    - **Only major change to S&T budget was creation of J-UCAS ($284 M in PE0606400D8Z)**
  - **Continued Growth in Joint Experimentation (Navy Pass through; $151M (FY04) to $167M (FY05))**
  - **Services account for 51% of total S&T Dollars (about same as FY04 with out Devolvement)**

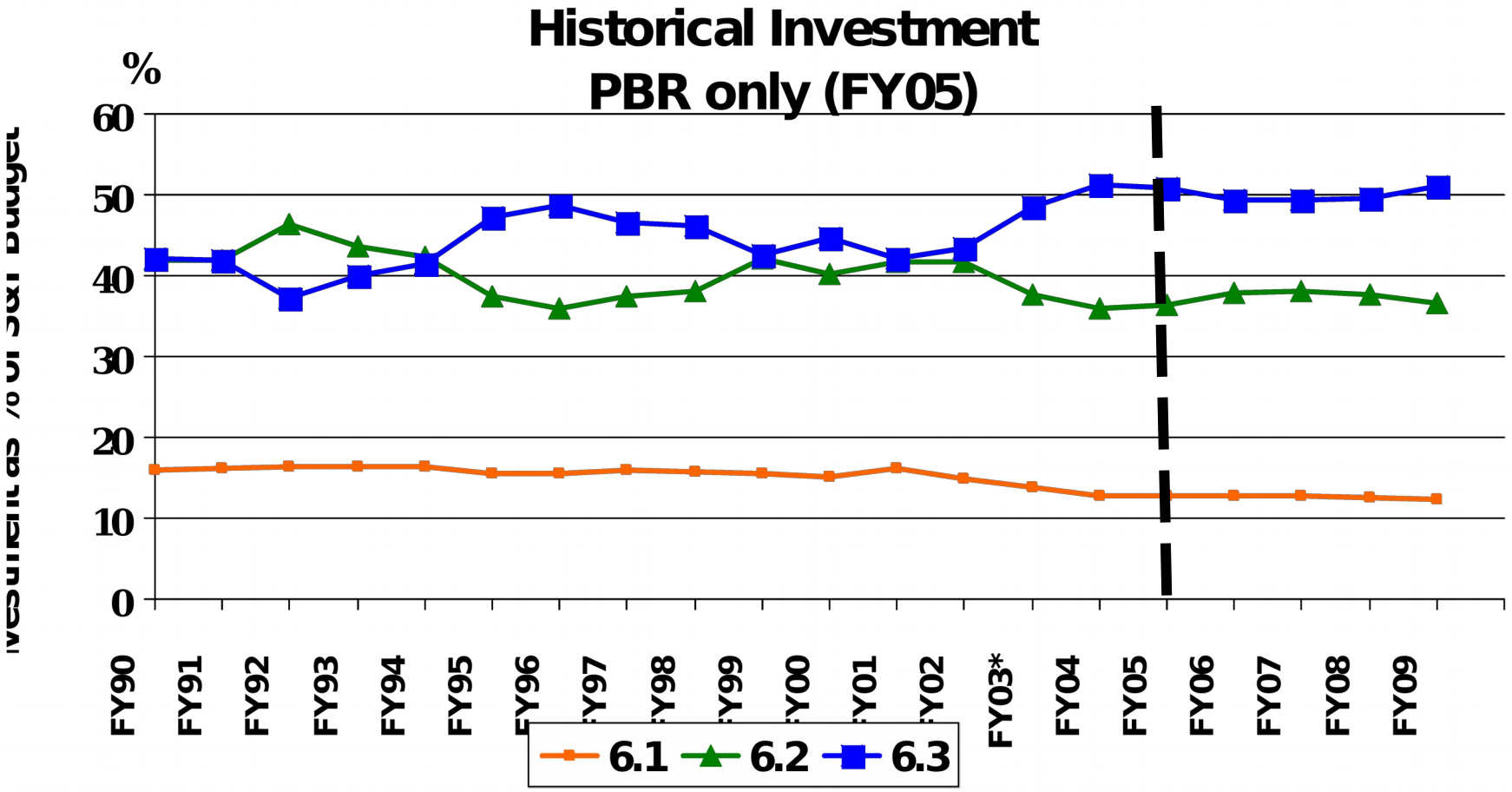
DoD S&T—Macro Scale



** Then Year FY05-09*

Y03, includes$323M allocated to Def Emergency Response Fund S&T in a separate DoD transfer account

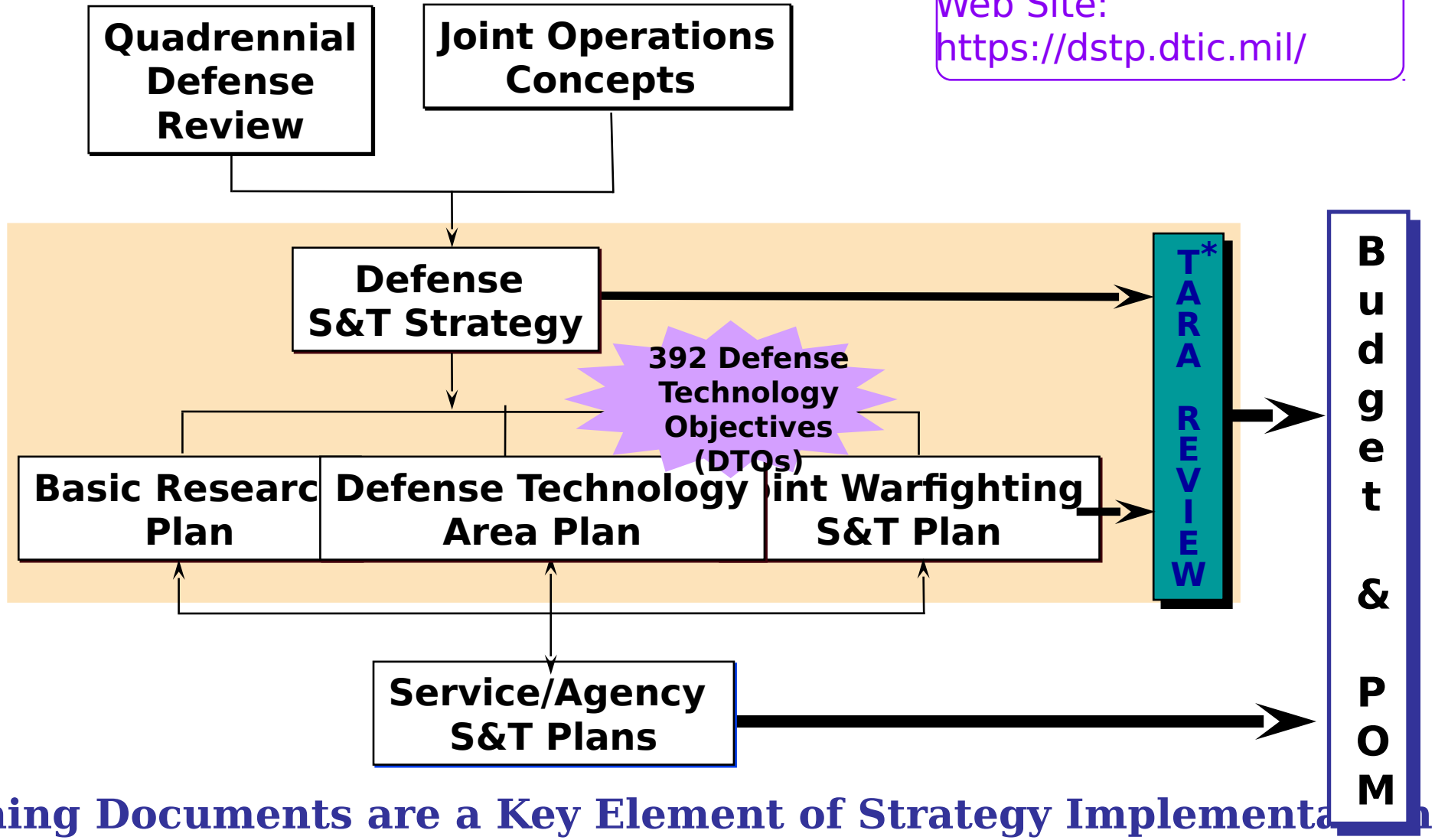
DoD S&T Programs as Percentage of S&T Budget



**FY03 includes DERF & NPR funding*

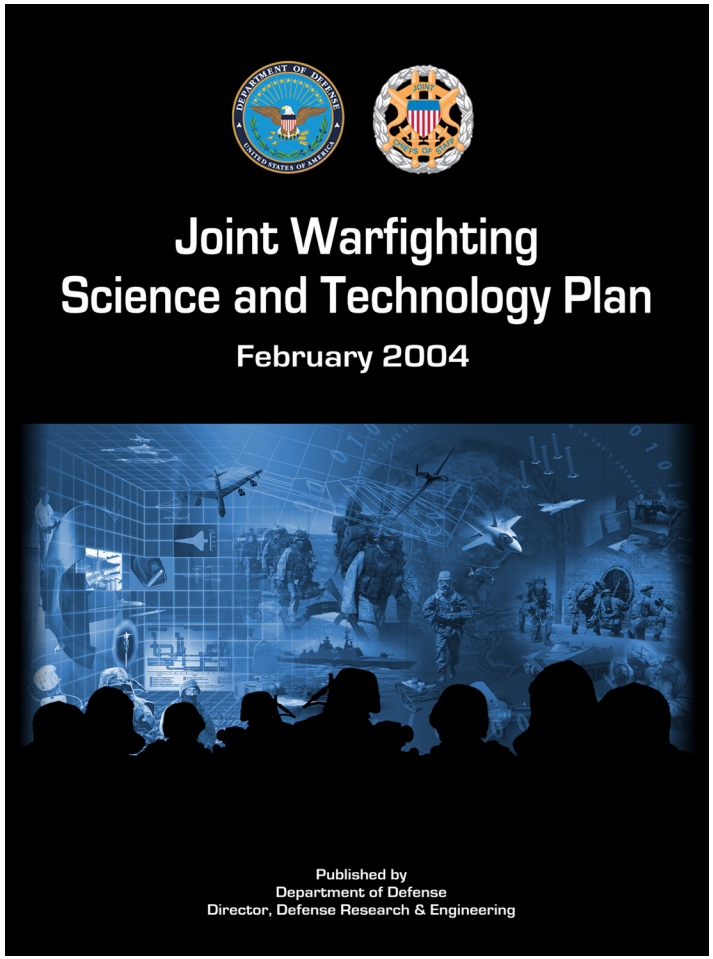
Integrated Annual Defense S&T Planning Process

Web Site:
https://dstp.dtic.mil/



ning Documents are a Key Element of Strategy Implementa n

S&T Strategy and Plans



Defense Science and Technology Strategy and Plans

- ***Defense S&T Strategy (Being Updated)***
- ***Basic Research Plan (6.1) - BRP -(Biennial)***
- ***Defense Technology Area Plan (6.2, 6.3) - DTAP - (Biennial)***
- ***Joint Warfighting Science and Technology Plan - JWSTP (*Annual)***
- ***Defense Technology Objectives (DTO) Volume that supports JWSTP and***

Basic Research Plan (BRP)

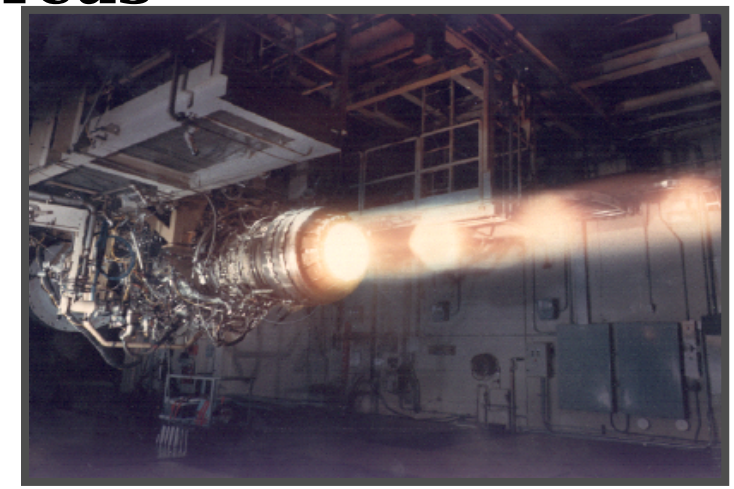
BRP-- A strategic plan to link longer term research to broad, revolutionary warfighter capabilities

- **Basic Research Areas**
  - Physics
  - Chemistry
  - Mathematics and Computer Science
  - Electronics
  - Materials Science
  - Mechanics
  - Terrestrial and Ocean Sciences
  - Atmospheric and Space Sciences
  - Biological Sciences
  - Cognitive and Neural Science

A Strategic plan guiding new technology development built around Basic Research Areas

Defense Technology Area Plan (DTAP)

- **DTAP -- A detailed plan focusing DoD science on militarily significant technologies in specific functional areas**



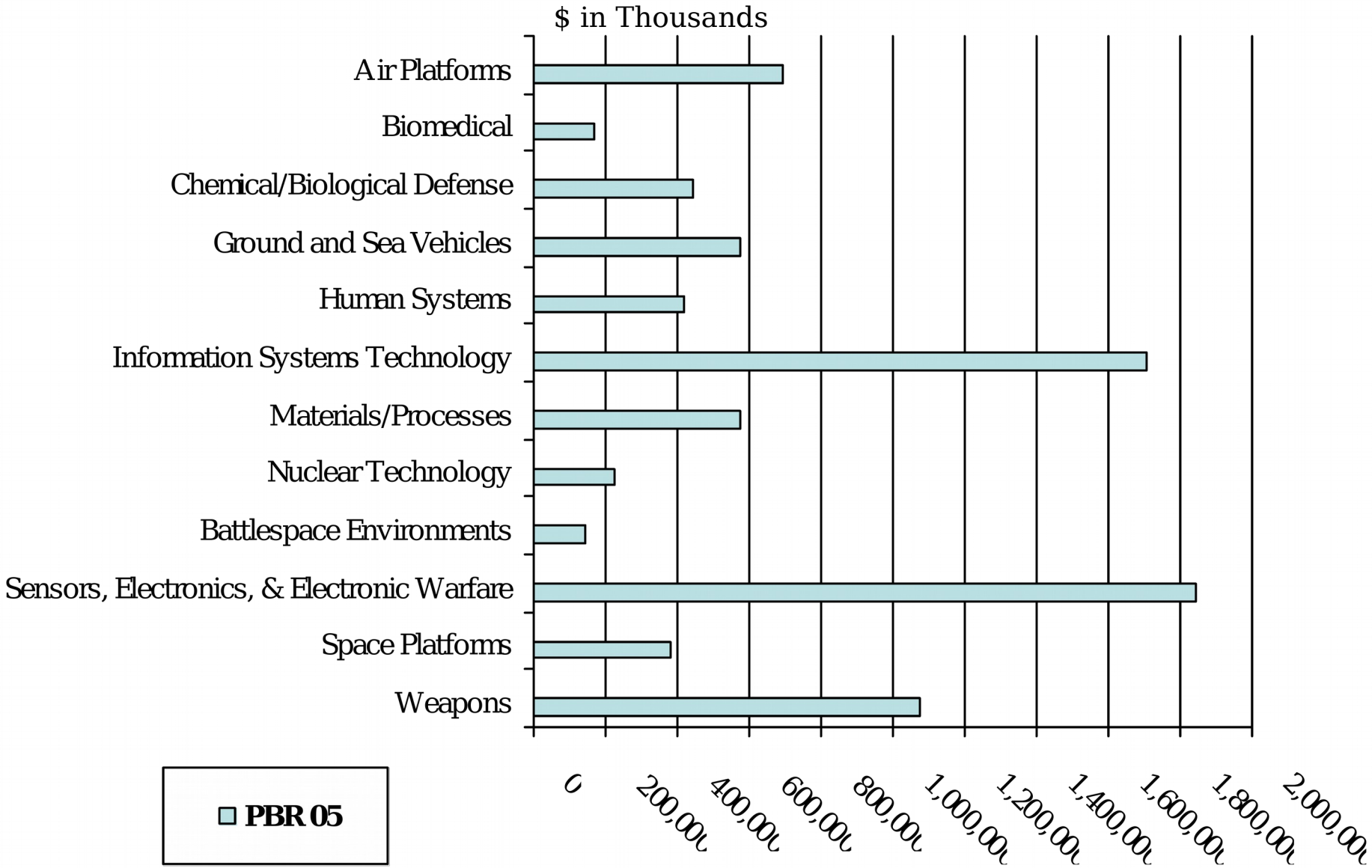
Example: DTO AP.08 Fighter/Attack Propulsion

An agreement between the S&T Community and Acquisition Customers

Defense Technology Area Plan

- **Twelve technology focus areas in February 2003 edition:**
  - **Air Platforms**
  - **Chemical-Biological Defense**
  - **Nuclear Technology**
  - **Information Systems**
  - **Materials & Processes**
  - **Weapons**
  - **BioMedical**
  - **Battlespace Environments**
  - **Sensors, Electronics and Electronic Warfare**
  - **Space Platforms**
  - **Human Systems**
  - **Ground & Sea Vehicles**
- **Provides a horizontal perspective across Service and Defense Agency efforts, thereby charting total DoD investment for a given technology area**

FY05 Defense Technology Areas



Joint Warfighting S&T Plan (JWSTP)

JWSTP-- Focus to blend emerging technology into warfighter needs

Enhanced Situational Awareness for Individuals/Leaders in MOUT
Precise Position Location inside of buildings
Improved Squad Radio Effective in MOUT
"Thru-wall" scanning capability for MOUT Squad Leader
Combat ID System - Effective in buildings
Improved MOUT Individual Mobility Tools
Increased Lethality/ Wpns Capabilities for MOUT
Improved All Environment Optics (Day, Night, I2, Thermal, etc…)
Physical Protection Kit (Eyes, Joints, Medical, Hearing, etc…)
Non Lethal Munitions
"Real time" Intel Down-link to Map Products
Remote Intel Collection Capability for Battalion & below

An agreement between Joint Warfighters and S&T Community

Required annually by Congress on 1 March

"a plan for ensuring that the science and technology program of the Department of Defense supports the development of future joint

February 2003 JWSTP JWCOs

- Information Superiority
- Precision Engagement
- Combat Identification
- Air and Missile Defense
- Military Operations on Urbanized Terrain
- Focused Logistics and Sustainment of Strategic Systems
- Dominant Maneuver
- Electronic Warfare
- Counterproliferation of Weapons of Mass Destruction
- Combating Terrorism
- Protection of Space Assets
- Hard and Deeply Buried Target Defeat
- Warrior Readiness

Capabilities-Based Planning

"A central objective of the Quadrennial Defense Review was to shift the basis of defense planning from a "threat-based" model that has dominated thinking in the past, to a "capabilities-based" model for the future. This capabilities-based model focuses more on how adversaries might fight, rather than specifically whom the adversary might be or where a war might occur. It recognizes that it is not enough to plan for large conventional wars in distant theaters. Instead the United States must identify the capabilities required to deter and defeat adversaries who will rely on surprise, deception, and asymmetric warfare to achieve their objectives."

---Donald H. Rumsfeld, Secretary of Defense, September 30, 2001

Foreword to the Quadrennial Defense Review Report

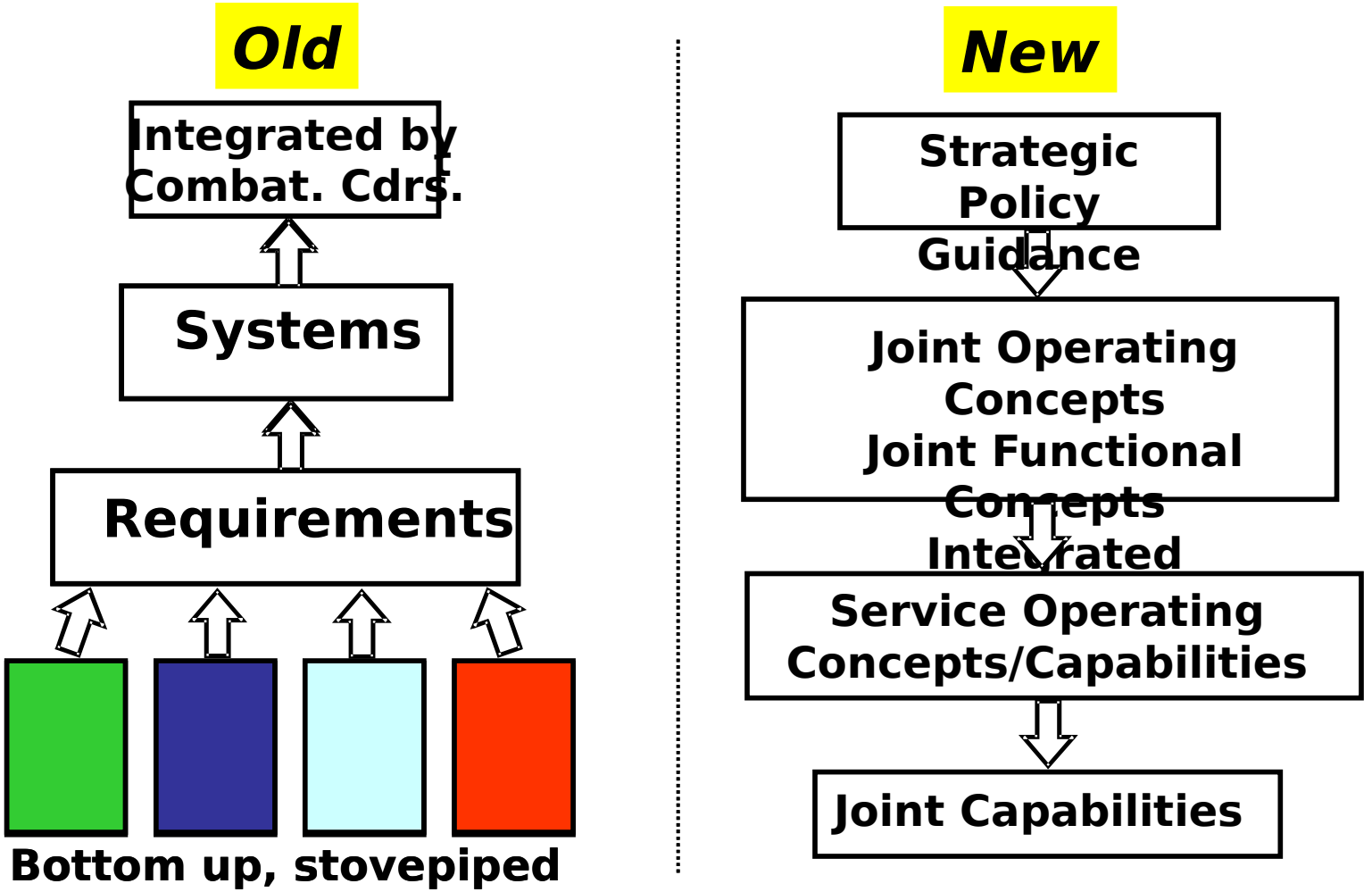
Capabilities-Based Planning
(Role of Science and Technology)

- **Joint Staff instruction for implementing capabilities-based planning**
  - ***Joint Capabilities Integration and Development System (JCIDS) - CJCSI 3170.01C, June 24, 2003***

"Science and Technology. The priorities of joint warfighting capabilities established through the JCIDS process should serve to inform the science and technology community and focus the development efforts of the community as specified in the Joint Warfighting Science and Technology Plan."

- **The JCIDS process provides an opportunity for the S&T community to be more involved much earlier in the process**

New Process


Old
Integrated by Combat. Cdrs.
Systems
Requirements
Bottom up, stovepiped
New
Strategic Policy Guidance
Joint Operating Concepts
Joint Functional Concepts
Integrated Service Operating Concepts/Capabilities
Joint Capabilities
Systems Driven
Capabilities Driven

Joint Functional Concepts

BATTLESPACE AWARENESS

Collect and analyze battlespace information

COMMAND AND CONTROL

Develop alternatives and disseminate orders

FORCE APPLICATION

Cause effects on the enemy

PROTECTION

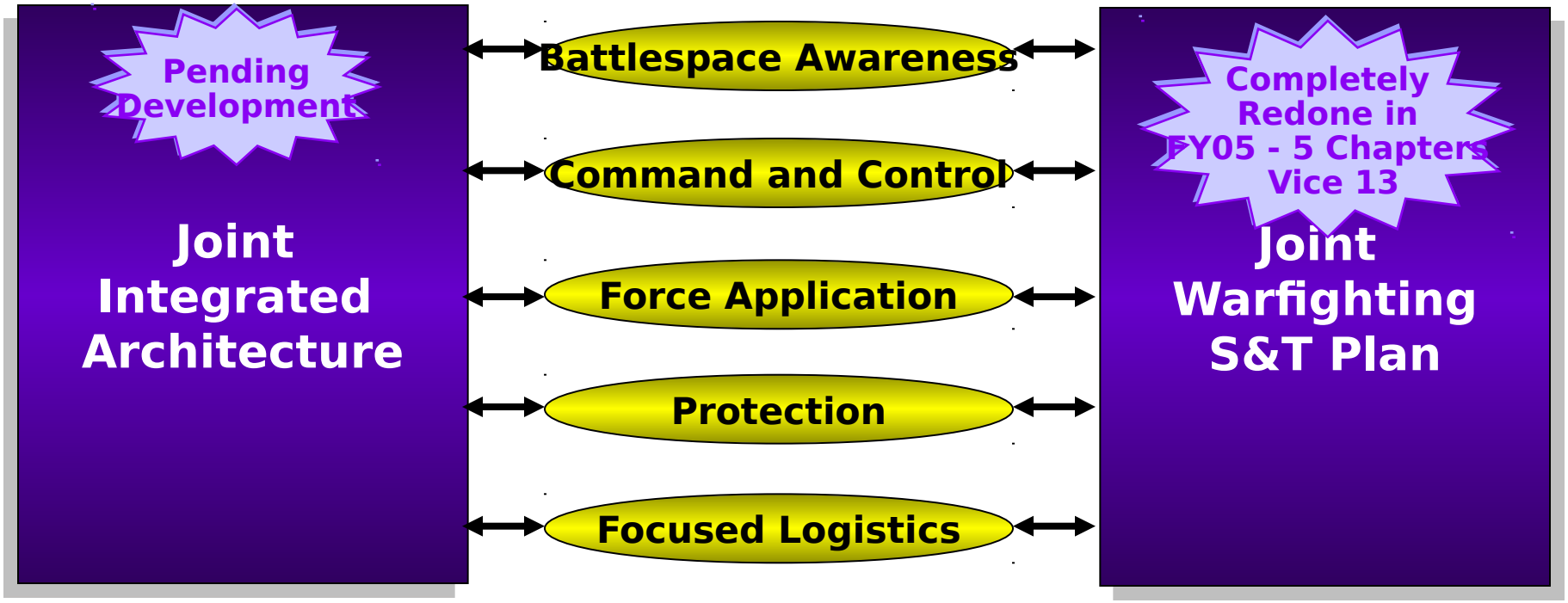
Prevent an enemy's effect on us

FOCUSED LOGISTICS

Sustain and support the force

Feb. 2004 Joint Warfighting Science & Technology Plan

DDR&E implemented a new process for FY2005
- more closely aligned with Functional Capability Boards

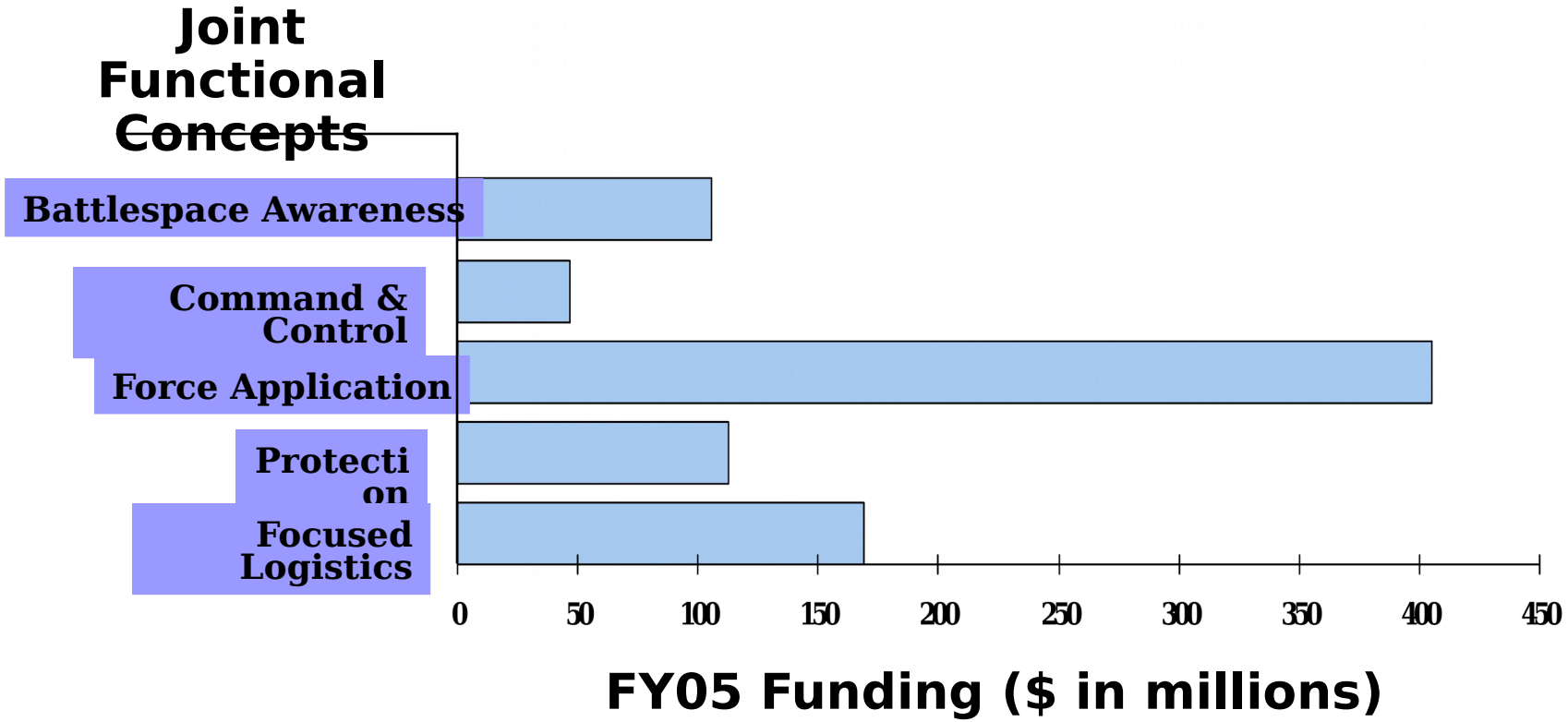


…5 Joint Functional Concepts, Each Representing Both Near and Far Term Capability Needs

…5 Chapters in JWSTP, Each Aligned With Joint Functional Concepts

Feb. 2004 JWSTP DTO Funding

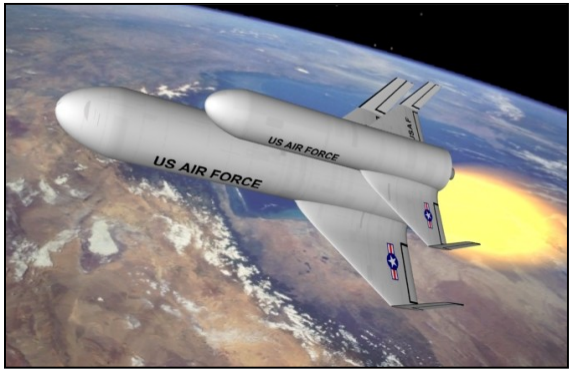
Total FY05 Investment: $840M



National Aerospace Initiative

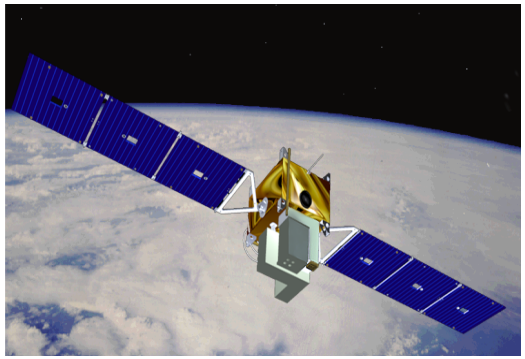
Hypersonics

- Vehicles
- Strategic Strike
- Fast Transport
- Time Critical Targets



Access To Space

- 1st Stage Air Breathing
- 2nd Stage Rocket
- Single Stage-to-Orbit



Space Technology

- Multifunctional Sats.

Total NAI Investment Portfolio, PB-05 ($M)

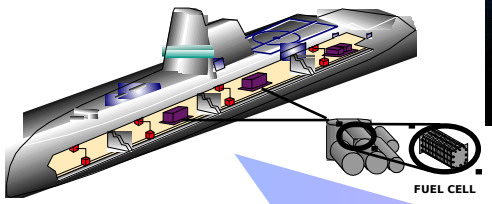
Service/Agency	FY 05	FY 06	FY 07	FY 08	FY 09
Air Force	$637	$645	$744	$829	$856
Navy	$28	$28	$32	$40	$40
Army	$110	$85	$110	$106	$102
DARPA	$298	$239	$245	$261	$263
TOTAL	$1,073	$997	$1,131	$1,236	$1,261

Power and Energy Technologies

POWER GENERATION
- Fuel Cells & Fuel Reforming
- Novel Power

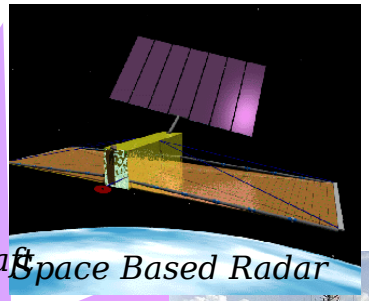
ENERGY STORAGE
- Batteries
- Capacitors

POWER MANAGEMENT & CONTROL
- Switching & Conditioning
- Power Transmission & Distribution
- Thermal Management



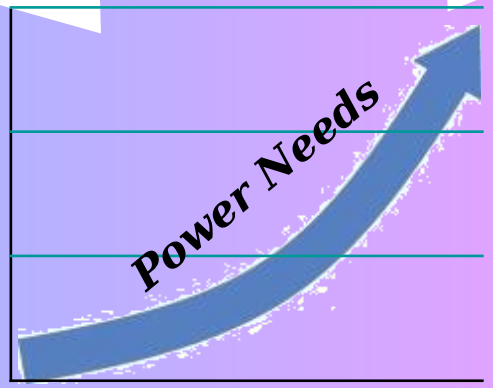
Electric Warship

More Electric Aircraft



Space Based Radar

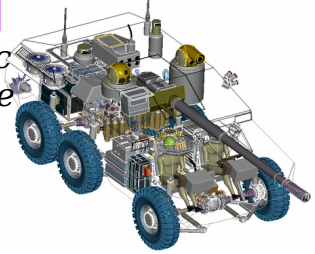
Electric Warship

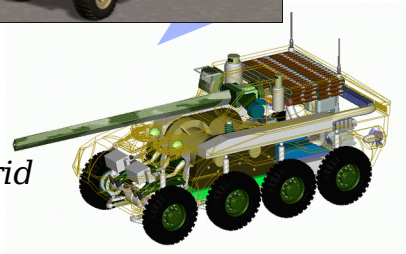


High Power Microwave

Warrior

Hybrid/Electric Combat Vehicle





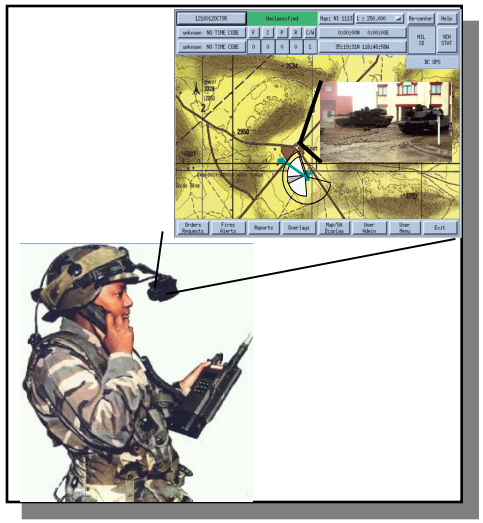
Electric/Hybrid Weapons

New Operational Capabilities

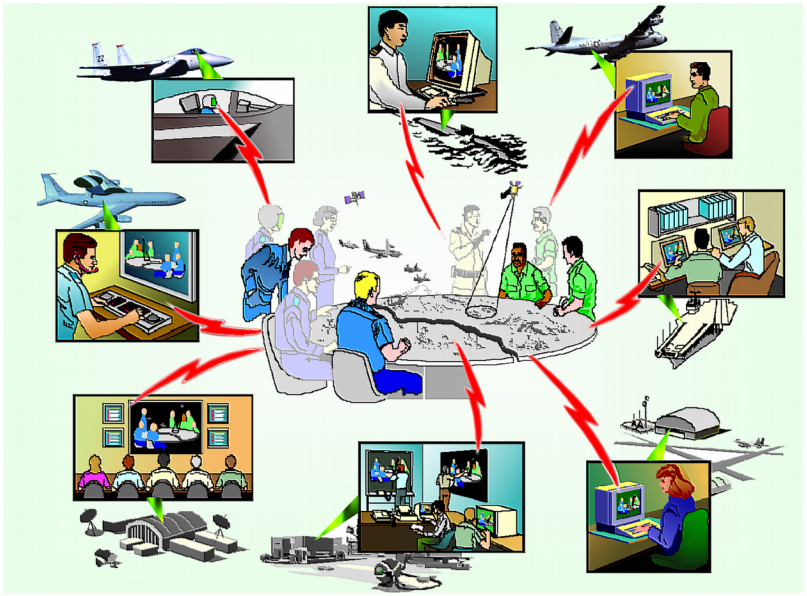
Total EPTI Investment Portfolio, PB-05 ($M)

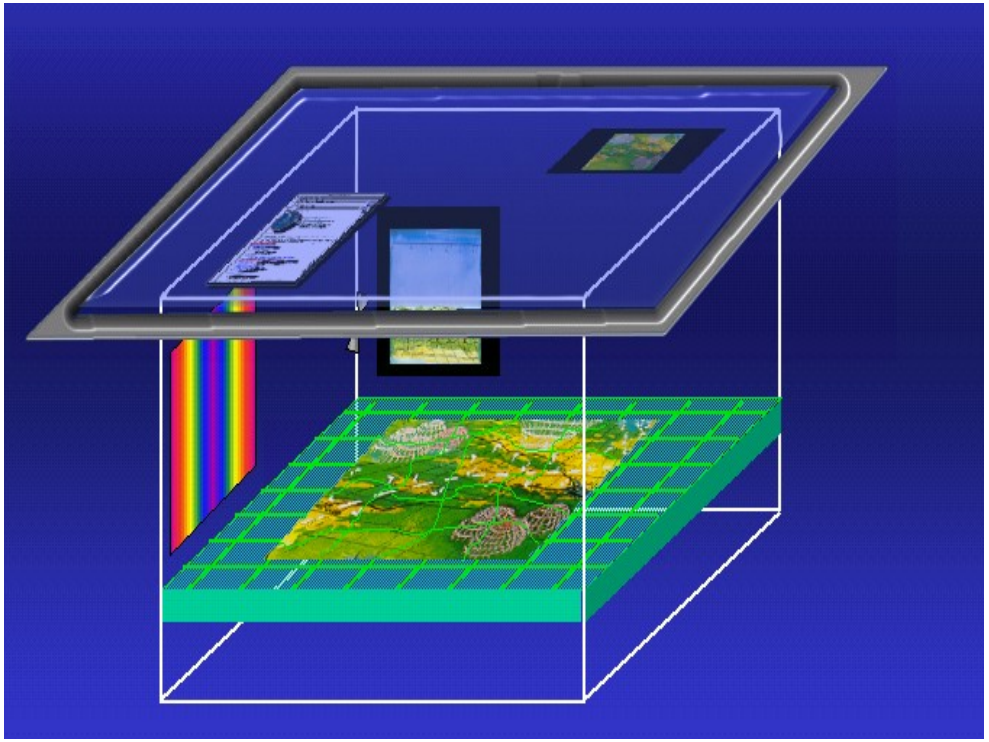
Service/Agency	FY 05	FY 06	FY 07	FY 08	FY 09
Air Force	$29	$34	$33	$37	$38
Navy	$93	$83	$101	$103	$99
Army	$72	$107	$111	$147	$140
DARPA	$97	$80	$64	$48	$22
TOTAL	$291	$304	$309	$335	$299

Surveillance & Knowledge Systems



- High Bandwidth Communications / Information Assurance
- Sensors and Unmanned vehicles (Robotics, UAVs, etc.)
- Information / Knowledge Management Systems
- Cyber Warfare





Total SKS Investment Portfolio, PB-05 ($M)

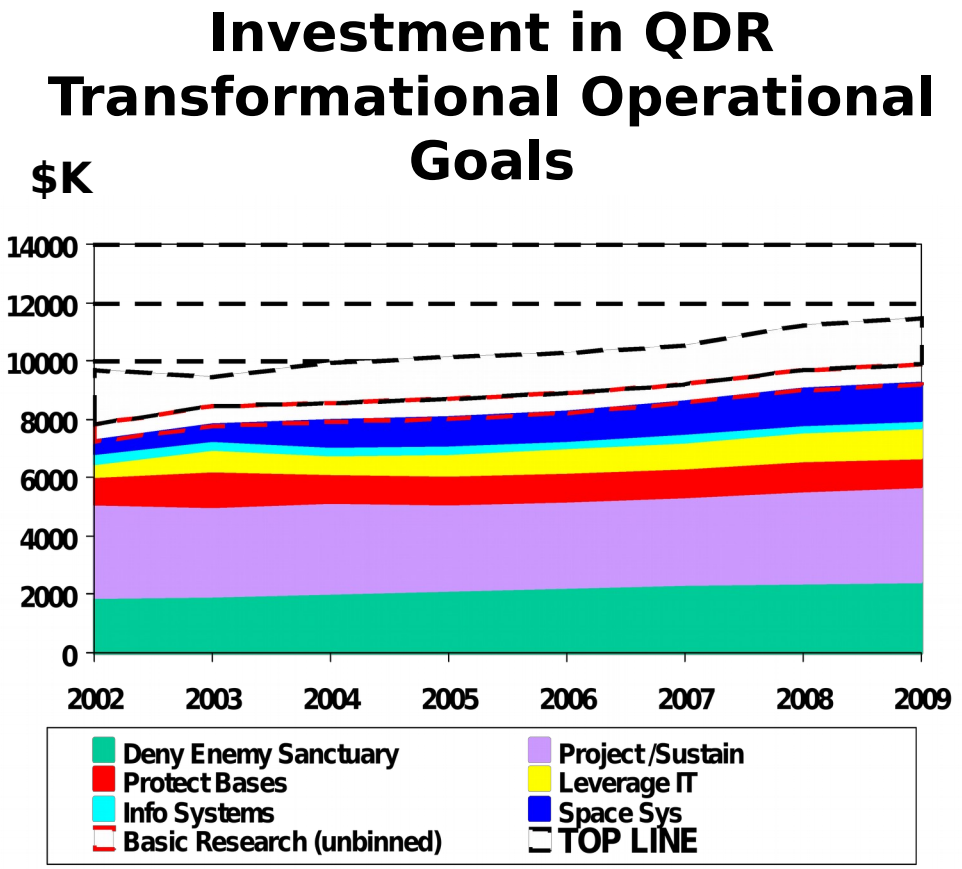
Service/Agency	FY 05	FY 06	FY 07	FY 08	FY 09
Air Force	$254	$276	$306	$296	$303
Navy	$215	$227	$229	$217	$221
Army	$175	$216	$220	$193	$184
DARPA	$342	$306	$332	$348	$354
TOTAL	$986	$1025	$1087	$1054	$1062

QDR Operational Goals

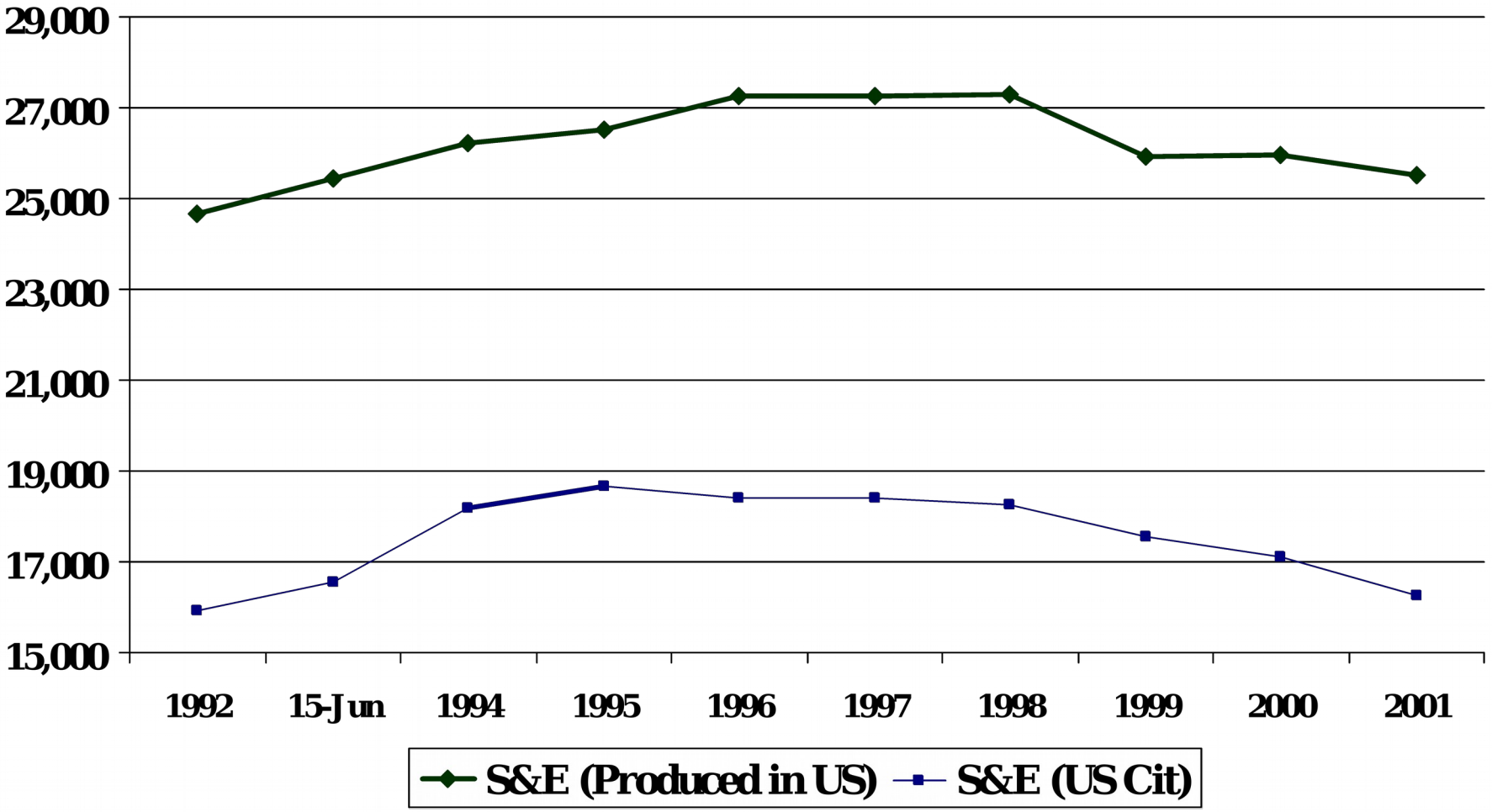
- **Critical Transformational Capabilities**
  - **Protect Bases of Operations**
  - **Conduct Information Operations**
  - **Project and Sustain US Forces**
  - **Deny Enemy Sanctuary**
  - **Conduct Space Operations**
  - **Leverage Information Technologies**

Linking S&T to Transformation Study: Findings Based on FY04 BES

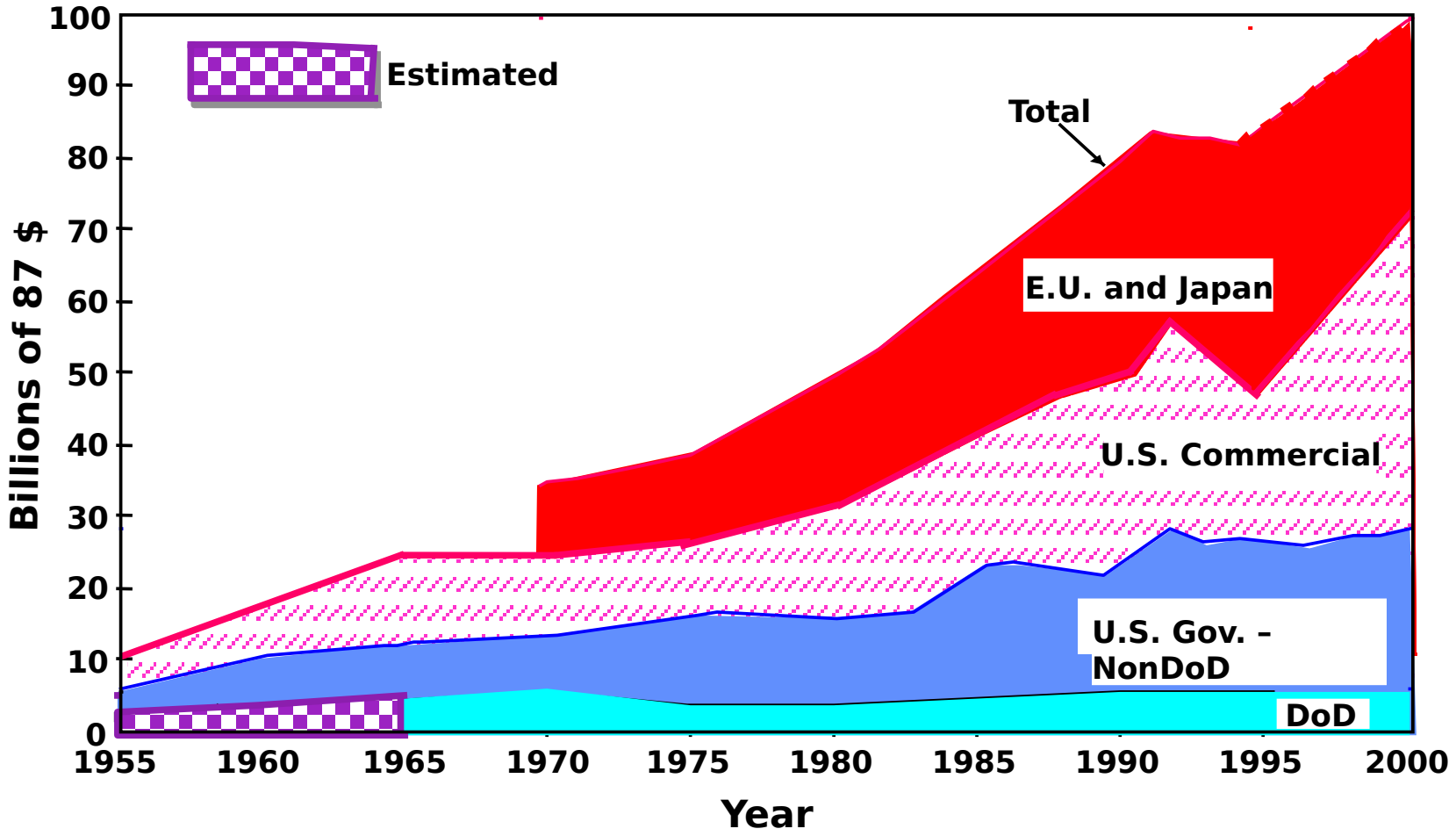
- **Approximately 80% of the DoD S&T program is invested in QDR Transformational Operational goals**
- **Remaining 20% includes Basic Research & other enabling technologies**
  - **Advanced Electronics**
  - **Materials**
  - **Medical Programs**
  - **Environmental Restorations**
  - **Dual Use S&T**
  - **Life Cycle Extension**



Scientist & Engineering PhD's



U.S. and Worldwide Research Base

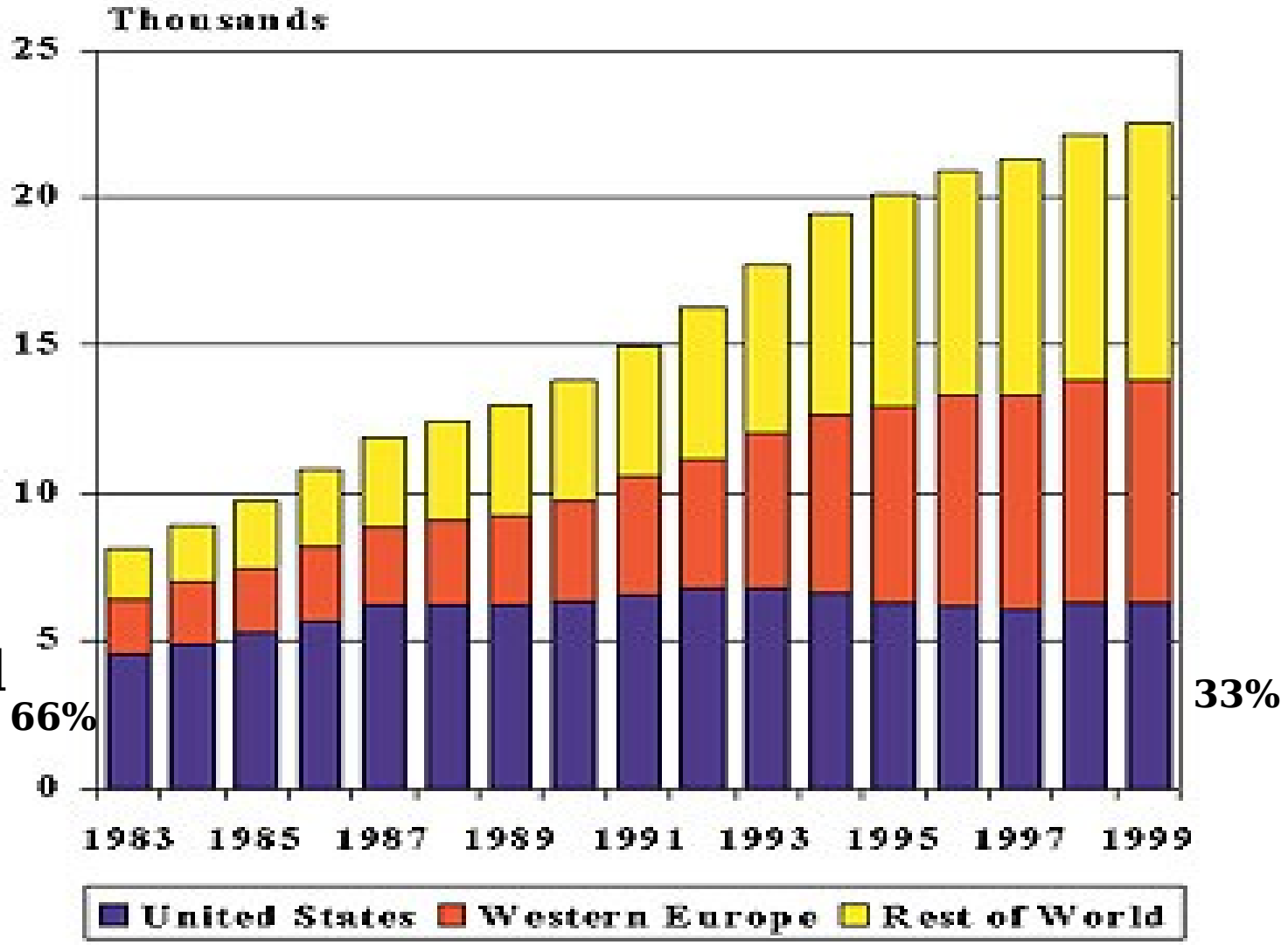


Source: Report of the Defense Science Board Task Force on the Technology Capabilities of Non-DoD Providers; June 2000; Data provided by the Organization
for Economic Cooperation and Development & National Science

U.S. No Longer Leads the World in the Generation of New Scientific Knowledge

The Warning

Physical Review & Submission of Technical Papers



Source: American Physical Society - *APS News*

Quick Reaction Special Projects (QRSP)

- **Defense Acquisition Challenge Program – Primarily for Industry**
  - Provides opportunities for inserting innovative and cost-saving technology into acquisition programs
  - Funds for the test and evaluation of proposed technology, <u>not implementation</u>
- **Technology Transition Initiative – For Government S&T Community**
  - Establishes a Technology Transition Council
  - Jump starts selected components/subsystems into systems
  - Bridges the “Valley of Death”
- **Quick Reaction Fund – CTTF/Force Protection**
  - Provides flexibility to respond to emergent DoD needs within budget cycle
  - Takes advantage of technology breakthroughs in rapidly evolving technologies
  - Completion of projects within a 6-12 month period

QRSP Funding Profile (PE 0603826D8Z)

		FY05 PBR ($ Millions)				
	FY 04	*FY 05*	*FY 06*	*FY 07*	*FY 08*	*FY 09*
Current PB-05 Funding Request	46.566 *	64.389	89.927	90.408	92.111	94.143
Defense Acquisition Challenge Program	17.793	21.463	29.976	30.136	30.704	31.381
Technology Transition Initiative	13.251	21.463	29.976	30.136	30.704	31.381
Quick Reaction Fund	15.522	21.463	29.976	30.136	30.704	31.381

* **Appropriated Value**

Summary

- **Strong S&T investment will enable Transformation**
- **DoD S&T budget remains a "good news" story**
  - **Budget requests up about 35% (then year dollars) under current Administration**
  - **DoD S&T program is largely aligned to support Transformation Operational Goals**
  - **S&T Enterprise has reacted quickly to the Global War on Terrorism**